



TRANSLATION

I, Michiru Yasui, residing at 3-22-8, Hirai, Edogawa-ku, Tokyo, Japan,
state:

that I know well both the Japanese and English languages;

that I translated, from Japanese into English, the specification, claims, abstract and drawings as filed in U.S. Patent Application No. 10/025,568, filed December 26, 2001; and

that the attached English translation is a true and accurate translation to the best of my knowledge and belief.

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Patent & Trademark Office

- 1 -

TITLE OF THE INVENTION

IMAGE FORMING APPARATUS AND METHOD OF CONTROLLING THE
APPARATUS

BACKGROUND OF THE INVENTION

5 An image forming apparatus optically reads an
image of a document set on a document table, and prints
the read image on a sheet of paper.

 In such an image forming apparatus, it is
convenient if an image read from a document can be sent
10 to an external apparatus (such as a personal computer).

BRIEF SUMMARY OF THE INVENTION

 An image forming apparatus according to a first
aspect of the present invention is aimed at enabling
sending of an image, read from a document, to the
15 outside.

 An image forming apparatus according to a first
aspect of the present invention comprises:

 a document table configured to set a document
thereon;

20 a scan section configured to optically read an
image of the document set on the document table;

 an input section configured to input an E-mail
address;

 a judging section configured to judge whether
25 the E-mail address inputted by the input section is
an address registered in advance;

 a storing section configured to store the image

- 2 -

read by the scan section if the judgment result of the
judging section is positive;

5 a first generating section configured to generate
an E-mail having the E-mail address inputted by the
input section as its destination address, and with
a URL indicating a location of the stored image, if the
judgment result of the judging section is positive;

10 a second generating section configured to generate
an E-mail having the E-mail address inputted by the
input section as its destination address, and with the
image read by the scan section, if the judgment result
of the judging section is negative; and

15 a transmitting section configured to transmit the
E-mails generated in the respective generating
sections.

20 Additional objects and advantages of the invention
will be set forth in the description which follows, and
in part will be obvious from the description, or may be
learned by practice of the invention. The objects and
advantages of the invention may be realized and
obtained by means of the instrumentalities and
combinations particularly pointed out hereinafter.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

25 The accompanying drawings, which are incorporated
in and constitute a part of the specification,
illustrate presently preferred embodiments of the
invention, and together with the general description

given above and the detailed description of the preferred embodiments given below, serve to explain the principles of the invention.

FIG. 1 is a diagram showing the appearance of
5 an embodiment.

FIG. 2 is a diagram showing the internal structure of the embodiment.

FIG. 3 is a diagram showing a control panel of the embodiment.

10 FIG. 4 is a block diagram showing a control circuit of the embodiment.

FIG. 5 is a diagram showing the main functions of the system controller of FIG. 4.

15 FIG. 6 is a flow chart for explaining an operation of the embodiment.

FIG. 7 is a diagram showing a format of an E-mail of the embodiment to which a URL is attached.

FIG. 8 is a diagram showing a format of an E-mail of the embodiment to which image data is attached.

20 DETAILED DESCRIPTION OF THE INVENTION

An embodiment of the present invention will now be described with reference to the drawings.

As shown in FIG. 1 and FIG. 2, a transparent document table (glass panel) 2 for setting a document
25 thereon is provided on an upper surface portion of a main body 1. An indicator 3 is provided on one side portion of the document table 2. A portion of

difference in level between the indicator 3 and the document table 2 serves as a reference position for setting a document.

5 A plurality of document sensors 11 described below are arranged on a lower surface side of the document table 2. The document sensors 11 optically sense the presence/absence and the size of document D set on the document table 2.

10 A carriage 4 is provided on the lower surface side of the document table 2, and an exposure lamp 5 is provided on a carriage 4. The carriage 4 and exposure lamp 5 constitute exposure means. The carriage 4 can move (reciprocate) along the lower surface of the document table 2. The document D set on the document
15 table 2 is exposed to light by turning on the exposure lamp 5 while the carriage 4 reciprocates along the document table 2.

By this exposure, a reflected light image from the document D is obtained, and is projected onto a CCD
20 (charge-coupled device) 10 by reflecting mirrors 6, 7 and 8 and a variable-power lens block 9. The CCD 10 has a number of photo-electric conversion elements in its light-receiving region, and outputs an image signal corresponding to the image of the document D, by being
25 subjected to repeated line-scanning on the light receiving region.

The image signal outputted from the CCD 10 is

amplified and converted into a digital signal, and the digital signal is suitably processed by an image processing section 73 described below and then supplied to a laser unit 27. The laser unit 27 emits a laser beam B corresponding to the input signal.

A window 12 for reading the document therethrough is provided at a position adjacent to the indicator 3 of the document table 2. The window 12 has a size and form corresponding to the longitudinal length of the indicator 3.

An auto document feeder (hereinafter abbreviated to "ADF") 40, also serving as a document table cover, is provided over the document table 2, indicator 3 and window 12 so as to be openable/closable. The ADF 40 has a tray 41 for setting a document thereon, feeds documents D set on the tray 41 one by one to the window 12 so that each of the documents passes over the window 12, and discharges each of the passed documents D to a tray 42. When the ADF 40 operates, the exposure lamp 5 emits light at a position corresponding to the window 12, and the light is irradiated to the window 12. Each of the documents D passing over the window 12 is exposed to the light irradiated to the window 12 through the window 12.

By this exposure, a reflected light image from each of the documents D is obtained, and is projected onto the CCD 10 by the reflecting mirrors 6, 7 and 8

and variable-power lens block 9.

In the upper surface portion of the main body 1, a control panel 13 for setting operation conditions is provided at a position not covered with the ADF 40.

5 As shown in FIG. 3, the control panel 13 comprises a liquid crystal display 14 of a touch-panel type, ten keys 15 for inputting numerical values, an all-clear key 16, a copy key 17, and a stop key 18. An operator can input data (including an E-mail address) by
10 touching the liquid crystal display 14. The liquid crystal display 14 can display the inputted data, and thus functions as an input section for inputting an E-mail address.

In the meantime, a photosensitive drum 20 is
15 rotatably provided in an approximately central portion in the main body 1. A charging unit 21, a developing unit 22, a transferring unit 23, a separating unit 24, a cleaner 25, and a discharging unit 26 are successively arranged around the photosensitive
20 drum 20. Further, laser beam B, which is emitted from the laser unit 27, is irradiated onto a surface of the photosensitive drum 20 through a space between the charging unit 21 and the developing unit 22.

At a bottom portion of the main body 1,
25 a plurality of paper cassettes 30 are provided as a paper storing section. A number of sheets of copying paper P being different in size are stored in the paper

- 7 -

cassettes 30. When the copy key 17 is pressed, copying paper P is taken out sheet by sheet from any one of the paper cassettes 30. A pick-up roller 31 is provided for each of the paper cassettes, as a taking out
5 section for taking out paper.

Each of the taken-out sheet of copying paper P is separated from the paper cassette 30 by a separating unit 32, and sent to a resist roller 33. The resist roller 33 feeds the copy paper P between the
10 photosensitive drum 20 and the transferring unit 23, at a timing in consideration of rotation of the photosensitive drum 20.

The charging unit 21 charges the surface of the photosensitive drum 20 with an electrostatic charge, by
15 applying a high voltage to the photosensitive drum 20. Laser beam B emitted from the laser unit 27 is irradiated onto the charged surface of the photosensitive drum 20. The laser unit 27 forms an electrostatic latent image corresponding to
20 the image read from the document D on the surface of the photosensitive drum 20, by main-scanning (line-scanning) the beam on the surface of the photosensitive drum 20 in one direction, and sub-scanning a beam thereon for repeating the main
25 scanning with rotation of the photosensitive drum 20.

The electrostatic latent image on the photosensitive drum 20 is made visible by receiving

a developer (toner) at the developing unit 22.

The visible image is transferred onto a copying paper sheet P by the transferring unit 23. The copying paper sheet P onto which the visible image has been

5 transferred is separated from the photosensitive drum 20 by the separating unit 24. The developer and electric charge remain on the surface of the photosensitive drum 20 from which the sheet of copying paper P has been separated. The remaining developer is
10 removed by the cleaner 25. The remaining charge is removed by the discharging unit 28.

The sheet of copying paper P which has been separated from the photosensitive drum 20 is sent to a fixing unit 35 by a carrier belt 34. The fixing
15 unit 35 fixes the transferred image onto the sheet of copying paper P by heat. The fixed copying paper P is sent to an outlet 37 by a delivery roller 36, and discharged from the outlet 37 to a tray 38 outside the main body 1.

20 A power switch 39 is provided on the other side surface of the main body 1.

FIG. 3 shows a control circuit of the apparatus.

A control panel controller 80, a scan controller 90, and a print controller 100 are connected to
25 a system controller 70. The system controller 70 performs centralized control of the control panel controller 80, scan controller 90 and print controller

- 9 -

100, and comprises a copy-mode control section to
correspond to operation of the copy key 17, a printer
mode control section for controlling a printer mode to
correspond to an image input from outside to a net
5 interface 77 described below, and a facsimile mode
(FAX mode) control section for controlling a facsimile
mode to correspond to images received by a FAX sending
and receiving unit 78.

Further, a ROM 71 for storing a control program,
10 a RAM 72 for storing data, an image processing section
73, page memory controller 74, hard disk unit 76, the
net interface 77, and the FAX sending and receiving
unit 78 are connected to the system controller 70.
The page memory controller 74 controls reading and
15 writing of image data to a page memory 75. Further,
an image data bus 701 interconnects the image
processing section 73, the page memory controller 74,
the hard disk unit 76, the net interface 77, and the
FAX sending and receiving unit 78.

20 The net interface 77 functions as an input section
for the printer mode, into which data (image data)
transmitted from an external apparatus is inputted, and
as an output section for a transmission mode for
transmitting data (image data) read in the main body 1.
25 A network, such as a LAN 110, is connected to the net
interface 78. External apparatuses, such as a server
111 and a plurality of personal computers 112, are

- 10 -

connected to the LAN 110, as well as the Internet 120.

The FAX sending and receiving unit 78 is connected to a telephone line 130, and functions as a receiving section for the facsimile mode, for receiving an image (image data) transmitted by fax through the telephone line 130.

The liquid crystal display 14, ten keys 15, all-clear key 16, copy key 17, and stop key 18 are connected to the control panel controller 80.

Connected to the scan controller 90 are a ROM 91 for storing a control program, a RAM 92 for storing data, a shading correction section (SHD) 93, a CCD driver 94, a scan motor driver 95, the exposure lamp 5, and ADF 40, and the plurality of document sensors 11, etc. The CCD driver 94 drives the CCD 10. The scan motor driver 95 drives a scan motor 96 for driving the carriage. The ADF 40 has a document sensor 43 for sensing a document D set on the tray 41 and the size of the document.

The scan controller 90 mainly composes a scan section for a copy mode, which optically reads an image of the document D.

A ROM 101 for storing a control program, a RAM 102 for storing data, a laser driver 103, a polygon motor driver 104, and a main motor driver 106 are connected to the print controller 100. The laser driver 103 drives the laser unit 27. The polygon motor driver 104

drives the polygon mirror motor for scanning the laser beam B onto the photosensitive drum 20. The main motor driver 106 drives the main motor 107 which is the driving source of the photosensitive drum 20 and paper carriage mechanism, etc.

The print controller 100 mainly composes a print section for printing an image read by the scan section, an image inputted from outside into the net interface 78, and an image received by the FAX sending and receiving unit 79, on the sheet of copying paper P of the paper cassettes 30.

Further, as shown in FIG. 5, the system controller 70 has the following sections (1)-(6), together with the control section for the copy mode, the control section for printer mode, and the control section for facsimile mode, as main functions.

(1) A first judging section for judging whether an E-mail address inputted by the control panel 13 is an address registered in advance in an internal memory as an object of security control.

(2) A second judging section for judging, in the case where the judgment result of the first judgment section is negative, whether the E-mail address inputted by the control panel 13 is an address registered in advance in the internal memory as an object of reporting a URL.

(3) A memory control section for storing, if

the judgment result of the first judgment section is positive, an image (image data) read by the scan section in the server 111.

5 (4) A first generating section for generating an E-mail addressed to the E-mail address inputted by the control panel 13 and with a URL (uniform resource locator) indicating a location of the image (image data) stored in the server 111, if the judgment result of the first judgment section is positive or the
10 judgment result of the second judgment section is positive.

(5) A second generating section for generating an E-mail, with the image (image data) read by the scan section, addressed to the E-mail address inputted by
15 the control panel 13, if the judgment result of the second judgment section is negative.

(6) A transmitting section for transmitting the E-mail generated by each of the generating sections to the outside via the net interface 77.

20 Next, the operation of the apparatus will now be described with reference to the flow chart of FIG. 6.

When a document D is set on the document table 2, each of the document sensors 11 senses the setting state and the size of the document D. Then, when the
25 copy key 17 is pressed, an image of the document D on the document table 2 is read ("YES" of step S1).

At this time, if a transmission mode has been set

by the control panel 13 ("YES" of step S2) and
 an E-mail address has been inputted by the control
 panel 13 ("YES" of step S3), it is judged whether the
 inputted E-mail address has been registered in advance
 5 as an object of security control (step S4).

If the inputted E-mail address has been registered
 in advance as an object of security control ("YES" of
 step S4), the image (image data) read by the scan
 section is stored in the server 111 on the LAN 111
 10 (step S5). Then, as shown in FIG. 7, an E-mail
 addressed to the inputted E-mail address and including
 a URL indicating the location of the image (image data)
 stored in the server 111, is generated (step S6).
 The generated E-mail is transmitted to the server 111
 15 on the LAN 110, for example (step S7).

The transmitted E-mail is captured by a personal
 computer 112 of a specific user via the server 111.
 The captured E-mail is opened on the personal
 computer 112. Thereby, the URL attached to the E-mail
 20 is displayed on a display of the personal computer 112.

The user of the personal computer 112 can capture
 the image (image data) stored in the server 111 into
 his/her personal computer 112, by accessing the
 displayed URL. The captured image is displayed on the
 25 display of the personal computer 112. The displayed
 image can be printed on paper sheets by a printer
 attached to the personal computer 112.

- 14 -

As described above, the URL is reported to users having respective E-mail addresses registered in advance as objects of security control, since no problem of security occurs if the URL is reported to them. The load of the server 111 is lightened, since the server 111 deals with E-mails having a smaller data amount. Lightening of the load prevents errors in transferring E-mails from the server 111 to the personal computers 112.

In the meantime, if the inputted E-mail address has not been registered in advance as an object of security control ("NO" of step S4), it is judged whether the inputted E-mail address has been registered in advance as an object of the URL (step S8).

If the inputted E-mail address has not been registered in advance as an object of the URL ("NO" of step S8), an E-mail addressed to the inputted E-mail address and with the image (image data) read by the scan section, as shown in FIG. 8, is generated as shown in FIG. 8 (step S9). Further, the generated E-mail is transmitted to the server 111 on the LAN 110, for example (step S7).

The transmitted E-mail is captured by a personal computer 112 of a specific user via the server 111. The captured E-mail is opened on the personal computer 112. Thereby, the image (image data) attached to the E-mail is displayed on the display of the

personal computer 112.

The displayed image can be printed on paper sheets by a printer attached to the personal computer 112.

As described above, not the URL but the read image
5 is transmitted to users having respective E-mail addresses which have not been registered in advance as objects of security control, since reporting the URL to these users causes a security risk.

Further, the URL is reported to users having
10 respective E-mail addresses registered in advance as objects for reporting the URL ("YES" of step S8), as an exception (steps S5, S6 and S7).

Additional advantages and modifications will readily occur to those skilled in the art. Therefore,
15 the invention in its broader aspects is not limited to the specific details and representative embodiment shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as
20 defined by the appended claims and their equivalents.